

Magnetism and Superconductivity in $\text{CeCu}_2(\text{Si}_{1-x}\text{Ge}_x)_2$ Probed by Cu NQR

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We report Cu-NQR results on Ge-doped heavy-fermion superconductor $\text{CeCu}_2(\text{Si}_{1-x}\text{Ge}_x)_2$ ($0 < x \leq 0.2$) and undoped CeCu_2Si_2 . The main effect of the Ge doping is considered to be a negative pressure, since the strength of hybridization between f and conduction electrons decreases with the Ge doping. We observed the broadening of the Cu-NQR spectra originating from an internal field at the Cu site, and a distinct hump in $1/T_1$ at T_N even in the slightly doped sample with $x = 0.01$. With increasing Ge concentration, T_N increases and T_c decreases from the same temperature of 0.65 K, implying that the magnetic and the superconducting phases are almost degenerate in pure CeCu_2Si_2 . Correspondingly, the dynamical characteristics of the magnetic order at $x = 0$ change to more static ones, that results in a localized regime of f electrons above $x \sim 0.25$. In the region of small x , we propose the low-energy magnetic fluctuations and superconductivity coexist in a microscopic view. The pressure effect on $\text{CeCu}(\text{Si}_{0.98}\text{Ge}_{0.02})_2$ is also reported, where the magnetic anomaly is suppressed by a small pressure.